

# Optical Transport Networking

FS focuses on designing various optical transmission solutions to make your business farther, faster, smarter.



## Description

FS OTN solution is designed to cost-effectively extend the optical link power budget for WDM solutions. It is fully managed, configured and monitored remotely as part of the network, via FMT management software, and incorporates several types of modules: EDFA, DCM, OEO, OLP, etc.

FS OTN solution enables high-speed, intelligent carrier access networks that are faster, more cost-effective and easier to manage. And it provides a solid foundation to **accommodate tomorrow's needs with a design optimized for** use in carrier access network environments where flexibility, space and power are at a premium.

## Benefits

- 100% traffic separation and up to 96 wavelengths via fiber pair
- Ultra-Large capacity, total capacity up to 960G transmission rate
- Individually controlled dual AC or DC pluggable power supply and fan unit
- Hot-swappable and replaceable on-site without impacting the running data communication
- Scalable and standardized solution with CWDM/DWDM Mux Demux, EDFA, DCM and OEO, NMU card
- Integrated Network Management Unit supports remote management via SNMP, simple for operation and maintenance

## Why FS OTN Solution?



### Ensure Quality & Certifications

Our operations, security and reliability meet the most stringent standards, like CE, RoHS, FCC. All the fiber optic products in FS support a lifetime guarantee.



### Reduce Power & Space Requirements

Integrate FMT infrastructure modules in one chassis to ensure centralized network management, which is conducive to saving space and can be easily expanded.



### Technical Support & On-line Service

FS provides 1-1 specific solution support for different applications and online service to meet your needs.

## Application Portfolios



### Passive Multiplexers

- DWDM Mux Demux: Up to 96 channels
- CWDM Mux Demux : Up to 18 channels
- CCWDM Mux Demux: Up to 18 channels
- DWDM OADM: Up to 16 channels
- CWDM OADM: Up to 16 channels

### FMT Infrastructure Modules

- Amplifier Modules
- Transponder (OEO) from 1Gbps up to 28.1Gbps
- DWDM Red/Blue Filter
- Dispersion Compensation Modules (DCM)
- Optical Line Protection Switch (OLP)
- Fiber Monitoring



## Three Factors That Affect OTN Design

1. Specific transmission distance

Specific distance is needed to estimate whether DCM is needed to compensate for the link.

2. Fiber type and link loss(typical 0.25dB/KM)

FS solution can be tailored to both dual and single fiber type. And link loss is necessary for collocating the most appropriate transceiver and active components like amplifier etc.

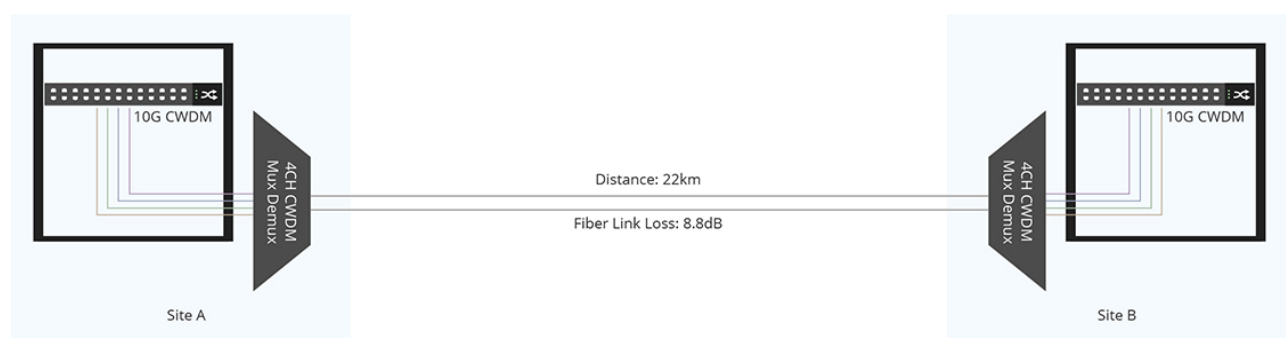
3. Capacity and transmission rate

The acquisition of capacity and data rate is beneficial to choose practical MUX or OADM to meet current transmission and future expansion.

## Ideal Solutions

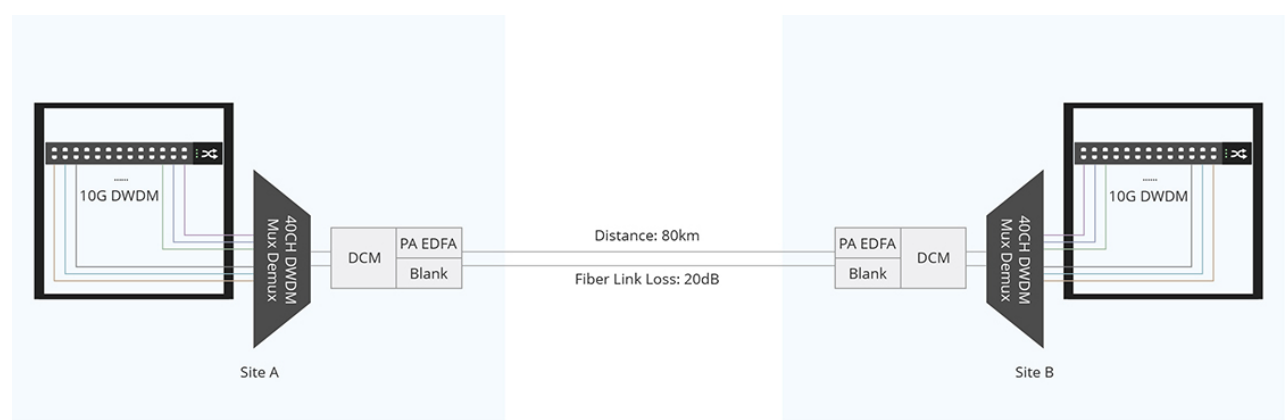
### CWDM Cost-efficient Transport in Short-haul Networks

The short-haul transmission can be accomplished without any additional device in the CWDM system.



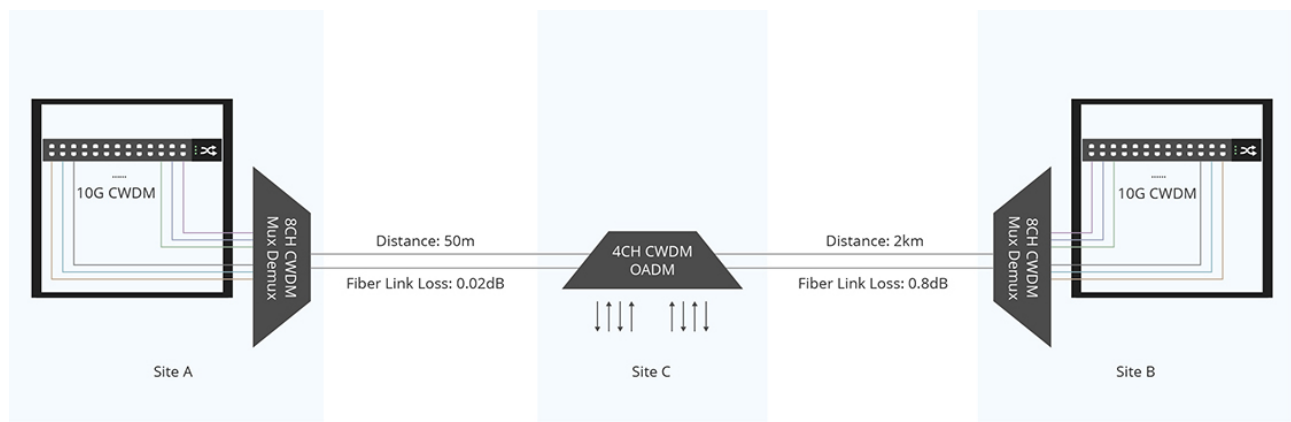
### DWDM Long-haul Transmission Solution

Boosted by Erbium-doped-fiber amplifiers (EDFAs), the DWDM systems can support point-to-point ultra-long haul applications without the need to add costly regenerators.



## Multi-span OADM Transmission

Using the OADM modules, network designers can add new one or more access points anywhere on a CWDM network, without impacting the remaining channels traversing the network.



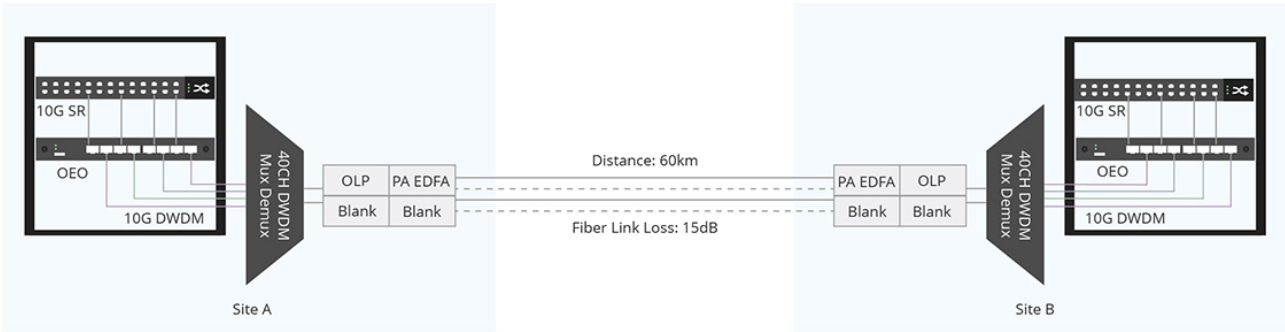
## DWDM over CWDM Network

CWDM wavelengths range from 1260-1625nm, channel spacing is 20nm, which actually cover all the range of DWDM wavelengths (1470-1625nm). And DWDM wavelengths have much smaller channel spaces (0.4nm/0.8nm). Therefore, the CWDM wavelengths near DWDM wavelengths can be used to transmit the DWDM wavelengths. In most practical applications, CWDM 1530nm channel is used to achieve hybrid CWDM & DWDM.



## DWDM Line Protection Solution

By real-time monitoring the power status in working fiber through OLP, the traffic will be automatically diverted to the protection line if the working line fails, which greatly reduces the huge loss of data information.



## High-level specifications



### Physical specifications

- Up to 4RU chassis
- Up to 100G transmission rate
- Up to 140km transmission distance
- Dual power and fan module supply
- Modular design and pluggable optics



### Topologies and protection

- Point-to-point and point-to-multipoint, linear add/drop and ring network
- Client, per-wavelength and multi-wavelength line with 1+1 redundancy service protection



### Network management

- SNMP
- Monitor online
- Simple management tool



### Protocol transparency

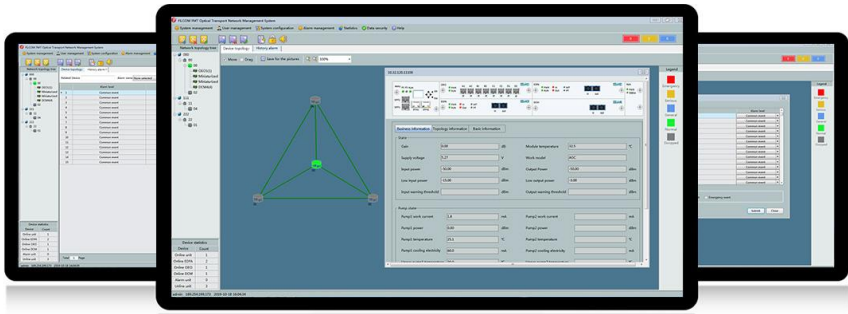
- Ethernet
- SDH/SONET
- PDH/OTN/SAN

## FMT Optical Transport Network Management System

FS.COM Network Management Unit (NMU/NMS) is developed with ARM9 control design. NMU/NMS provides full fault, configuration, performance, security management and instant push emails. FMT Monitor online management software (a Java-based network management system) built with modular client uses the Micosoftware SQL Server 2008R2 database.

### Features of Monitor Online

- 1) Email notification
- 2) Performance monitoring
- 3) Alarm and event management
- 4) User and security administration
- 5) Local and remote network management



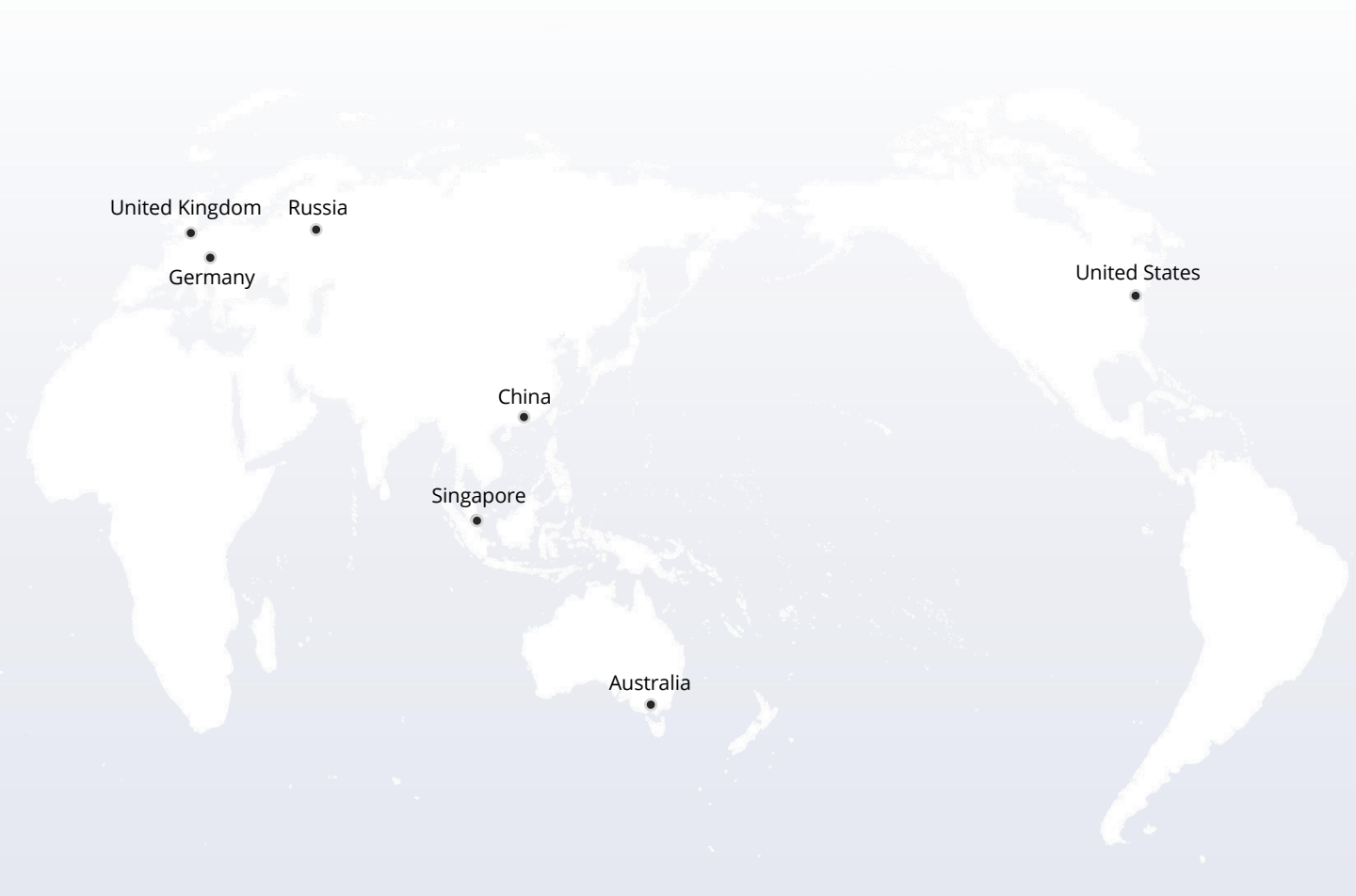
### Ordering Information

Category	ID	Description
Product		
DWDM MUX DEMUX	<a href="#">#35887</a>	40 Channels C21-C60, with 1310nm Port for 40G/100G LR4 and Monitor Port, LC/UPC, Dual Fiber DWDM Mux Demux, FMU 1U Rack Mount
DWDM MUX DEMUX	<a href="#">#33485</a>	40 Channels C21-C60, with Monitor Port, 3.0dB Typical IL, LC/UPC, Dual Fiber DWDM Mux Demux, FMU 1U Rack Mount
CWDM MUX DEMUX	<a href="#">#33489</a>	18 Channels 1270-1610nm, with Monitor Port, LC/UPC, Dual Fiber CWDM Mux Demux, FMU 1U Rack Mount
PA-EDFA	<a href="#">#72284</a>	20dB Gain Pre-Amplifier DWDM EDFA C-band 13dBm Output, LC/UPC, Pluggable Module for FMT Multi-Service Transport Platform
BA-EDFA	<a href="#">#36501</a>	22dBm Output Booster DWDM EDFA C-band 24dB Gain, LC/UPC, Pluggable Module for FMT Multi-Service Transport Platform
LA-EDFA	<a href="#">#36592</a>	17dBm Output In-Line DWDM EDFA C-band 17dB Gain, LC/UPC, Pluggable Module for FMT Multi-Service Transport Platform
DCM	<a href="#">#65779</a>	80KM DCF-based Passive Dispersion Compensation Module, 4.8dB Low Loss, LC/UPC, Pluggable Module for FMT Multi-Service Transport Platform
Transponder (OEO)	<a href="#">#30515</a>	4 Channels Multi-Rate WDM Converter (Transponder), 8 SFP/SFP+ Slots, Up to 11.3G Rate, Pluggable Module for FMT Multi-Service Transport Platform
FMT Chassis	<a href="#">#39214</a>	1U Managed Chassis Unloaded, Supports up to 4x EDFA/OEO/OLP Module with Accessories

Models	ID	Description
WDM Transport Platform		
FMT-1800	<a href="#">#73805</a>	FMT 1800 Efficient CWDM Connect (Set of Two), 180Gbps for 50km Dual Fiber BIDI End-to-End Metro Transport Platform, Dual 100V-240VAC in 1U Managed Chassis
FMT-1800	<a href="#">#76087</a>	FMT 1800 Efficient CWDM Connect (Set of Two), 90Gbps for 50km Single Fiber BIDI End-to-End Metro Transport Platform, Dual 100V-240VAC in 1U Managed Chassis
FMT-1600E	<a href="#">#76086</a>	FMT 1600E Extending DWDM Connect (Set of Two), 160Gbps for 60km Dual Fiber BIDI End-to-End Metro Transport Platform, Dual 100V-240VAC in 2U Managed Chassis
FMT-1600E	<a href="#">#73806</a>	FMT 1600E Extending DWDM Connect (Set of Two), 160Gbps for 120km Dual Fiber BIDI End-to-End Long Haul Transport Platform, Dual 100V-240VAC in 4U Managed Chassis
FMT-4000E	<a href="#">#73807</a>	FMT 4000E Competitive DWDM Connect (Set of Two), 400Gbps for 100km Dual Fiber BIDI End-to-End Long Haul Transport Platform, Dual 100V-240VAC in 4U Managed Chassis
FMT-4000E	<a href="#">#76085</a>	FMT 4000E Competitive DWDM Connect (Set of Two), 400Gbps for 160km Dual Fiber BIDI End-to-End Long Haul Transport Platform, Dual 100V-240VAC in 4U Managed Chassis
FMT-9600E	<a href="#">#73808</a>	FMT 9600E Hyperscale DWDM Connect (Set of Two), 960Gbps for 100km Dual Fiber BIDI End-to-End Metro Transport Platform, Dual 100V-240VAC in 2U Managed Chassis
FMT-9600E	<a href="#">#76084</a>	FMT 9600E Hyperscale DWDM Connect (Set of Two), 960Gbps for 80km Dual Fiber BIDI End-to-End with Monitoring System Metro Transport Platform, Dual 100V-240VAC in 4U Managed Chassis
OTN-4000	<a href="#">#90934</a>	40 Channels DWDM Dual Fiber End-to-End Transport Platform (20-140km)
OTN-1600	<a href="#">#90935</a>	16 Channels DWDM Dual Fiber End-to-End Transport Platform (20-140km)
OTN-800	<a href="#">#90936</a>	8 Channels DWDM Dual Fiber End-to-End Transport Platform (20-140km)

Note:

1. FS WDM transport platform contains devices at both ends without WDM transceivers
2. Free Accessory: 1\*Software CD, 1\*User Manual, 1\*Test Report, Screws M6 and Floating Nuts (Configuration as per capacity).



 <https://www.fs.com>



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